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ABSTRACT

Educators have relied on the work of Jean Piaget for many years in an effort to understand the intellectual capabilities of children and adolescents. Piaget, however, did not consider instruction and school experiences to be factors that influenced children's conceptual development. The Soviet psychologist, Lev Vygotsky, proposed the opposite: that instruction in and mastery of subject-matter knowledge are primary forces underlying cognitive growth. According to Vygotsky, high level cognitive processes emerge through student-teacher interactions. From these interactions students acquire knowledge as well as routines for regulating their use of that knowledge. Vygotsky describes self-regulation as an "inner-speech" function students internalize from the language that teachers use to mediate learning. His description of inner-speech functions mirrors American researchers' descriptions of metacognitive insights and skills. While results of American research indicate that students differ in their ability to monitor and control their own comprehension and learning, the researchers have not been able to explain why some students can control their own learning better than others. Vygotsky's theory suggests that American researchers may not be able to explain these differences because they have not examined the concepts students are expected to learn or the way teachers have mediated student learning. (FL)

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Other to Self-Regulation: Vygotsky's Theory of Cognitive Development and Its Implications For Improving Comprehension Instruction For Unsuccessful Students

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OTHER TO SELF-REGULATION: VYGOTSKY'S THEORY OF COGNITIVE DEVELOPMENT AND ITS IMPLICATIONS FOR IMPROVING COMPREHENSION INSTRUCTION FOR UNSUCCESSFUL STUDENTS

Results of current research suggest that text comprehension depends on students actively using background knowledge and executive routines for regulating their own comprehension and learning performance (Bransford, 1979; Brown, Campione, & Day, 1978). One implication of recent findings is that comprehension processes and conceptual development are closely related. While researchers have formulated elaborate theories of how knowledge is represented in memory and subsequently used to process information in texts, much less is known about how students acquire new knowledge and strategies for controlling their own learning (Kintsch, 1978). Reading educators and researchers realize that content area instruction influences concepts students acquire and use to study and understand textbooks. Nevertheless, few researchers have examined specifically (1) how content area instruction affects the kinds of knowledge and information processing strategies students develop as they progress through school, or (2) how these types of development interact with and influence students' ability to comprehend and learn from subject-matter texts.

Perhaps the most widely known theory of conceptual development is that of Piaget (Kuhn, 1979). Educators have relied on Piaget's work for several decades to help themselves understand the intellectual

capabilities of children and adolescents. Recently, experimental psychologists also have borrowed from Piaget's theory to explain processes underlying comprehension and memory performance (Brown, 1980). Piaget, however, did not consider instruction and school experiences to be factors which influenced conceptual development in children (Duckworth, 1979). Indeed, a common interpretation of Piaget's theory is that intellectual development results from maturation or biological processes; therefore, children can achieve mature forms of intellectual functioning even if they are not exposed to the types of knowledge and instruction provided by teachers in schools.

The purpose of this paper is to describe briefly an alternative theory of cognitive development. I will focus on the theory formulated by Vygotsky, a Soviet psychologist, because he proposed that instruction in and mastery of subject-matter knowledge are primary forces underlying cognitive growth (Vygotsky, 1962, 1978, 1979). Since Vygotsky developed his theory nearly fifty years ago, I will begin by discussing why his theory is still relevant to current issues in educational research. I will then summarize his ideas about (1) the origins of higher intellectual operations and (2) the self-regulatory functions of inner-speech. Finally, I will describe global implications Vygotsky derived for educational practice and how these implications apply to the comprehension instruction for unsuccessful students.

Vygotsky's Influence on Current Research

Because Vygotsky died in 1934, many readers might assume that his work has no current value. Such an assumption would be incorrect for at

least two reasons. First, Vygotsky (1978, 1979) saw social interactions among teachers and students as well as instruction in formal school disciplines as central to children's acquisition of knowledge and self-regulatory skills. A basic premise of his theory is that psychologists will not be able to understand or explain highly developed cognitive skills in adults until they discover how school instruction affects cognitive development in children.

Many comparative psychologists who study cross-cultural differences in memory performance attribute their interest in this area to Vygotsky's hypotheses about the effects of formal school instruction on intellectual development (Cole & Scribner, 1974). Results of these studies raise serious questions about the universality of Piaget's stage model; and, they support Vygotsky's assumption that children's acquisition of conceptual skills varies as a function of the type of education they receive and the level of literacy they achieve (Wagner, 1978; Scribner, 1979).

A second reason Vygotsky's work still has current value is related to his research on the self-regulatory functions of inner-speech. The basic conclusion Vygotsky (1962) derived from his research is that without instruction in subject-matter areas, students cannot develop insights about how their own minds work and, therefore, do not develop the ability to use language (inner-speech) to guide, monitor, and control their own learning. Although American psychologists have not directly addressed the issue of inner-speech as it relates to learning in content-area disciplines, the theoretical functions of inner-speech described by Vygotsky underlie (1) current discussions about the construct of metacognition

(Brown, 1978), and (2) current research designed to improve the academic performance of unsuccessful students by training them to use executive routines or self-interrogatory strategies (Meichenbaum, 1977; Brown, Campione, & Barclay, 1979).

The Social Origins of Intellectual Development

What distinguishes Vygotsky's theory from the schema theories of Piaget and others is Vygotsky's claim that all higher level cognitive processes arise out of social experience. Each intellectual function a person acquires, like voluntary attention, concept formation, and deliberate memory strategies, must appear two times: first at a social, external level between individuals, and then at a personal, internal level within an individual. Transfer from external (social) to internal (individual) planes results from a prolonged series of events; but once a function is internalized, the structure and organization of one's mind is changed, moving individuals to higher levels of conceptual ability.

For example, children were seen to acquire symbolic processes like spoken and written language by interacting with their parents, teachers, and other adults. Such interactions allow children to identify and abstract effective means for speaking, remembering, and problem-solving. Internalization occurs only after children have first used cognitive operations in situations where adults or experts verbally mediate and regulate their performance. Gradually children transform or reconstruct these external operations and the means for regulating the operations so that they occur internally. Some operations may always remain external, but if an operation is internalized, the structure of the child's mind

is reorganized, creating new abilities in the child which would not have existed otherwise (Levina, 1979).

Thus, Vygotsky proposes that cognitive development results from learning experiences in which children are taught to use various intellectual or cognitive skills through social interactions with others. A basic implication of his theory is that the structure and quality of the intellectual abilities children develop reflect the structure and quality of the social interactions children have had with their parents and other adults. Vygotsky's emphasis on the social origins of development makes his theory of cognitive development distinct from the theories of most Western psychologists (Wertsch, 1979a).

The Development of Self-Regulatory Speech Functions

While Vygotsky saw all higher mental functions arising out of social interactions, he was basically interested in the regulatory or executive functions of inner-speech (Wertsch, 1979b). Vygotsky's description of inner-speech functions mirrors the American construct of metacognition (Brown, 1978; Flavell, 1979). In both constructs, inner-speech and metacognition, self-regulatory skills are defined as routines people use to plan, monitor, and direct their own cognitive behavior based on insights they have about how their own minds work. For each cognitive function people acquire, like text comprehension, self-regulation appears only after the function has been used and practiced unconsciously for long periods of time. Vygotsky's construct of inner-speech differs from the American construct of metacognition in that Vygotsky (1) emphasized self-regulation as a language function children acquire through social

interactions with their parents, teachers, and peers, and (2) attributed the development of this function specifically to students having to learn abstract concepts such as those taught in the academic courses of most schools.

Vygotsky (1962, 1979) defines inner-speech as language used to mediate thinking. The roots of this language function lie in children's acquisition of oral speech, or the ability to respond to and communicate with other people. Inner-speech, however, only develops as students learn ideas that reflect culturally shared and accumulated knowledge. Since schools are established to transmit this type of knowledge, Vygotsky proposed that school instruction induces two interrelated types of cognitive functions, concept formation and self-regulation.

Concept Formation

Vygotsky (1962, 1979) argues that by learning concepts in school students acquire a type of knowledge that is fundamentally different from concepts they acquire through everyday experience. For example, children can acquire and understand a concept like "brother" based on their everyday activities; but they cannot acquire and understand concepts like "manifest destiny" or "exploitation," unless someone teaches them history or other school concepts which make these theoretical ideas meaningful. School concepts are abstract, divorced from concrete experience, and have to be learned as systems of ideas that are organized in superordinate, coordinate, and subordinate relations. Learning such systems creates symbolic, hierarchial, knowledge structures in students which enable them to classify and generalize ideas and to think in relational terms.

Students must practice these thinking skills or operations unconsciously under adult guidance before they can subject the operations to deliberate direction and control. But once students grasp the significance of the structure of relations between ideas in one content-area, they can transfer and use this type of knowledge to learn more complex concepts in that area as well as concepts in other domains of school instruction.

Self-Regulation

According to Vygotsky (1979), as students acquire new knowledge, they also acquire routines for regulating and controlling their use of that knowledge. Self-regulation occurs only after students perceive the significance of structural relations among concepts and only after teachers have verbally mediated and guided students' use of the concepts for extended periods of time. From these mediated learning experiences, students eventually acquire language for regulating their own learning, and they do so by reconstructing in their own minds the speech or language forms teachers use to teach them (Wertsch, 1979a, Vygotsky, 1979). Through instruction, students learn what it means when a teacher asks them to remember, interpret, classify, compare, or judge ideas. Understanding these terms and the cognitive operations they label gives students insights about the functions of their own minds. These insights are what enable students to use language consciously to mediate and regulate their own thinking and study behavior.

To briefly summarize, Vygotsky describes self-regulation as an inner-speech function. This function emerges after students have had guided instruction and practice in using abstract ideas like those taught

in subject-matter disciplines. His basic hypothesis is that the structure of inner-speech forms students use to control their own thinking reflects the structure of the language their teachers used in teaching.

Both the nature (inner-speech) and the origins (content-area instruction) of self-regulation that Vygotsky proposed are obscured in most American research on executive functions or metacognitive routines. Instead, American researchers have simply identified and described such things as (1) the age at which students demonstrate different insights about their own cognitive abilities; (2) the difference between good and poor readers' use of self-regulatory or executive functions; and (3) the executive strategies adults use to monitor and control their own comprehension and learning (Kreutzer, Leonard, & Flavell, 1975; Brown & Smiley, 1977; Myers & Paris, 1978; Baker, 1979; Owings, Peterson, Bransford, Morris & Stein, 1979).

Neither the content students are expected to learn nor the type of verbal instruction they receive are major variables in American research. Yet, if Vygotsky is correct, American researchers must control for these variables in order to explain (1) how students develop routines for controlling their own learning and (2) why some students learn to monitor and control their own study behaviors better than others.

Educational Implications

Since Vygotsky observed that instruction, or mediated learning. typically preceded the acquisition of cognitive abilities, he concluded that "the only good kind of instruction is that which marches ahead of

development and leads it" (Vygotsky, 1962, p. 104). Because of this, Vygotsky criticized psychologists who recommended that teachers match instruction to the developmental levels of students derived from scores they obtained on standardized tests. He felt this was misguided because it focused instruction on levels of ability students had acquired in the past instead of levels of ability they could potentially achieve in the future.

To overcome this problem, Vygotsky proposed that tests of mental development be changed so that two levels of cognitive performance could be established: first, a level at which students can solve problems by themselves and, then, a level at which students can solve problems with assistance. The first score represents operations students have learned in the past and a level at which they can perform independently. The second score represents the level of operations students can perform when given help and guidance from others.

Vygotsky referred to the discrepancy or distance between students' performance at these two levels as the "zone of proximal development." This zone represents levels at which students are ready for and can benefit from instruction, and Vygotsky used the zone of proximal development as an index of mental ability. For example, Vygotsky (1962) and his associates found that students who achieved the same score on standardized tests when asked to solve problems by themselves differed markedly on the number of problems they could solve when given assistance. Some students could solve test problems designed for students several years older than themselves if given guidance, whereas other students could only solve

problems designed for students a few months older than themselves. Vygotsky (1978) felt this type of information was diagnostically more useful to teachers because it provided them with a measure of the levels at which instruction would be effective for different students as well as a measure of the amount and type of instruction different students required. Students with wide zones of proximal development require less explicit instruction and acquire new knowledge and skills more rapidly than students with narrow zones of proximal development. The latter students, according to Vygotsky, need more explicit instruction and guidance and they cannot progress as far or as rapidly as other students.

Versions of intelligence tests designed by Vygotsky, which include measures of reading comprehension, are still used in the Soviet Union today (see Wozniak, 1974). And recently an American researcher, Day (cited in Brown, 1981), has reported findings which support Vygotsky's criticisms of standardized tests and his concept of the zone of proximal development. Day found that even though junior-college students' obtained similar scores on measures of reading and writing ability, these students differed markedly in the amount and type of assistance they needed to improve their performance on summarizing tasks. Some students required very explicit instruction in summarizing rules and methods of monitoring their use of the rules; others required less explicit instruction. In addition, some of the students improved more than others in their ability to write summaries. Day interpreted these results as showing that the zone of proximal development differentiated students' readiness to benefit from instruction, how much they could improve with aid,

better than initial measures of independent writing performance.

Vygotsky's discussions about the zone of proximal development and the social origins of higher mental functions raise several questions about current practices common to reading education in the United States. The first has to do with procedures we use to establish instructional reading levels compared to the procedures Vygotsky used to establish the zone of proximal development. The other questions are related to the manner in which we modify instruction for unsuccessful students or poor readers.

Establishing Instructional Reading Levels

Vygotsky's (1962, 1978) construct of the zone of proximal development is similar to the American construct of instructional reading levels. Both constructs emphasize the need to determine levels at which students can benefit from or are ready for instruction as well as types of instruction that will help students attain higher levels of ability. However, the methods we use to establish instructional levels with informal reading tests and the methods Vygotsky used to establish the zone of proximal development are quite different.

In the testing procedure developed by Vygotsky, once an independent level of performance is established, the examiner then gives the student harder problems designed for more advanced students and helps the student solve the problems. The types of intervention or instructional aid Vygotsky describes include demonstrating solutions, asking leading questions, or suggesting possible answers. Thus, at the second stage of

testing, the test administrator actually teaches a student how to solve test problems in order to establish a level at which the student can learn if given assistance.

With most of the informal reading tests we use, however, instructional levels simply reflect the percentage of questions students can answer correctly by themselves or the percentage of oral reading errors they make. Rarely do teachers help students find answers to questions, teach them about information in a passage, or help them sound out difficult words. Therefore, the methods we use to establish instructional levels may actually underestimate students' capacity to benefit from instruction.

More importantly, since we do not provide instructional assistance during test sessions, we cannot use informal reading tests to obtain information about the type and amount of instructional support individual students need to improve their reading or learning performance. Vygotsky's procedure, on the other hand, captures an instructional level that approximates the conditions under which students can acquire new knowledge and skills if someone teaches them how to do so. His method more closely reflects the concept of and, perhaps, the original intent of using informal diagnostic tests to determine levels at which instruction can be effective for individual students.

Modifying Instruction for Unsuccessful Students

The construct of the zone of proximal development telescopes Vygotsky's views about the social origins of conceptual development and self-regulation. Vygotsky (1978) argues that instruction must precede

development because it creates the zone of proximal development in students. Instruction pushes students to master more complex and abstract conceptual structures and thereby awakens in them new capacities for learning. Students may not be able to operate on these structures by themselves, but they can do so if they are given guidance and support from others.

Vygotsky was especially opposed to education programs designed for unsuccessful students in which instruction was matched to student levels of independent performance and based on concrete experiences and concepts. That is he was opposed to instruction that did not lead students into new zones of proximal development. Vygotsky felt that teachers and schools should push unsuccessful students in particular to learn more abstract information and complex skills precisely because they cannot do so on their own. To Vygotsky, offering unsuccessful students an academically less rigorous curriculum only reinforced their learning handicaps and kept them from acquiring higher levels of cognitive ability.

In many American schools, unsuccessful students are usually those students who have difficulty learning from subject-matter texts. Because they cannot learn by reading textbooks, they are typically (1) tracked into courses specifically designed for academically less capable students, or (2) sent to some sort of remedial class for reading instruction. The intent in each case is to match instruction to levels at which students can succeed and then move them to higher levels of academic performance. Vygotsky's theory can be interpreted to suggest, however, that many of the practices associated with classes designed for unsuccessful

students may hinder rather than promote their acquisition of concepts and skills that underlie successful, self-regulated learning.

Modifying Subject-Matter Classes for Unsuccessful Students. Instruction in subject-matter courses designed for academically less capable students may perpetuate the learning difficulties these students have. Instruction in these classes often is modified so that students are expected to read less material and learn only concrete ideas or facts. Vygotsky argues, however, that the concepts students acquire in school directly affect the intellectual skills they develop. To Vygotsky (1962), abstract concepts are tools of thought which dramatically alter the nature and structure of people's minds. Students who learn abstract concepts, therefore, develop more powerful thinking skills than students who do not learn abstract concepts. Thus, teaching students only concrete ideas and expecting them to apply the ideas by reading less material may maintain students at low levels of academic and cognitive achievement.

Another example of an instructional practice that may hamper the conceptual development of unsuccessful students concerns the way we adapt content-area reading assignments for them. Typically, the pace of instruction is changed: students are expected to read less material and they are given more time to do so. Most often, instruction is simply a matter of having the students answer questions over assigned textbook material, and students are still expected to learn new concepts by reading about them. Rarely, however, do teachers modify the manner in which they mediate learning for unsuccessful students by increasing the amount of instructional support or assistance these students receive.

Unsuccessful students have difficulty grasping relations among ideas in content texts, perceiving the significance of the ideas, and retaining and using the ideas to complete various assignments. The learning difficulties these students experience cannot be overcome by simply giving them more time to complete reading assignments. Recognizing this, reading educators have devised numerous techniques content-area teachers can use to make relations among ideas explicit for unsuccessful students. Many of these techniques are good examples of ways teachers can mediate students' understanding of ideas they read.

But there is a difference between understanding information and knowing how to use or apply it appropriately when confronted with various memory or problem-solving tasks. This difference is seldom emphasized in texts reading educators design for content-area teachers. Nevertheless, expecting students to access or retrieve information to complete content-area assignments and tests assumes students have also been taught or know how to use the information appropriately. That is, it assumes students can regulate and control their own learning.

As noted by Vygotsky (1962), however, self-regulation of concepts taught in subject-matter areas develops only after students have had guided or mediated practice using the ideas they learn. Teachers not only have to mediate students' acquisition of new knowledge prior to reading, they must also mediate students use of the ideas after reading by teaching them how to apply the ideas in various types of tasks. From this instruction students can abstract and internalize the procedures and language teachers employ for regulating the use of ideas. Without

this type of instruction, many students may be unsuccessful at school tasks that involve remembering and applying information gained from reading. These students may be unsuccessful in content-area classes, not because they do not understand information they read, but because they are not given explicit instruction in how to apply new knowledge and evantually regulate it on their own.

Remedial Reading Instruction for Unsuccessful Students. Similar problems also occur in remedial reading classes. Perhaps remedial reading instruction helps students develop decoding skills. As it is usually organized, however, remedial instruction might not help students develop comprehension and learning strategies that can be transferred to subject-matter texts. In most remedial classes students are not expected to grasp, remember, and use ideas they gain from reading. Instead, they read a story or article, answer questions about it, and move on to another story or article which, in most instances, is unrelated to what they first read. The materials used are motivational, easy, or interesting to students and rarely do students have to learn new ideas that are abstract, related in complex structures, and divorced from their personal experience or past learning. Yet, according to Vygotsky (1962), only through mastery of this type of knowledge can transfer occur from one domain of instruction to another. Thus, we may maintain unsuccessful students at low levels of comprehension development by not expecting them to understand, remember, and apply abstract knowledge that can be transferred and applied to understanding subject-matter texts.

Summary

According to Vygotsky, high level cognitive processes emerge through interactions students have with teachers in schools. From these interactions students acquire knowledge as well as routines for regulating their use of that knowledge. Vygotsky describes self-regulation as an inner-speech function students internalize from the language teachers use to mediate learning. His description of inner-speech functions mirrors American researchers' descriptions of metacognitive insights and skills. While results of American research indicate that students differ in their ability to monitor and control their own comprehension and learning, these researchers have not been able to explain why some students can control their own learning better than others. Vygotsky's theory suggests that American researchers may not be able to explain these differences because they have not examined the concepts students are expected to learn or the way teachers have mediated student learning.

Baker, L. Comprehension monitoring: Identifying and coping with text confusions. (Tech. Report No. 145), Urbana, Illinois: Center for the Study of Reading, University of Illinois, September, 1979.

Bransford, J. D. Human cognition: Learning, understanding and remembering. Belmont, Calif.: Wadsworth Publishing Company, 1979.

Brown, A. L. Knowing when, where, and how to remember: A problem of metacognition. In R. Glaser (Ed.), Advances in Instructional Psychology. Hillsdale, NJ: Erlbaum, 1978.

Brown, A. L. Learning and development: The problems of compatibility, access, and induction. (Tech. Report No. 165). Urbana, Illinois: Center for the Study of Reading, University of Illinois, March, 1980.

Brown, A. L. Metacognition: The development of selective attention strategies for learning from texts. In M. L. Kamil (Ed.), Directions in Reading Research and Instruction, 30th Yearbook of the National Reading Conference. Washington, D. C.: The National Reading Conference, 1981.

Brown, A. L. , Campione, J. C. & Barclay, C. R. Training self-checking routines for estimating test readiness: Generalization from list learning to prose recall. Child Development, 1979, 50, 501-512.

Brown, A. L., Campione, J. C. & Day, J. D. Learning to learn: On training students to learn from texts. Educational Researcher, 1981, 10, 14-24.

Brown, A. L. and Smiley, S. S. Rating the importance of structural units of prose passages: A problem of metacognitive development. Child Development, 1977, 48, 1-8.

Cole, M. & Scribner, S. Culture and thought: A psychological introduction. N.Y.: John Wiley & Sons, Inc., 1974.

Duckworth, E. Either we're too early and they can't learn it or we're too late and they know it already: The dilemma of "applying Piaget." Harvard Educational Review, 1979, 49, 297-312.

Flavell, J. H. Metacognitive and cognitive monitoring. American Psychologist, 1979, 34, 906-911.

Kintsch, W. Learning from text, levels of comprehension, or: Why anyone would want to read a story anyway. Poetics, 1980, 9, 87-98.

Kreutzer, M. A., Leonard, C. & Flavell, J. H. An interview study of children's knowledge about memory. Monographs of the Society for Research in Child Development, 1975, 40 (1, Serial Number 159).

Kuhn, D. The application of Piaget's theory of cognitive development to education, Harvard Educational Review, 1979, 49, 340-360.

Levina, R. E. L. S. Vygotsky's ideas about the planning function of speech in children. In T. V. Wertsah (Ed. and trans.), The concept of activity in Soviet psychology. Armond, NY: M. E. Sharpe, Inc., 1979.

Myers, M. and Paris, L. Children's metacognitive knowledge about reading. Journal of Educational Psychology, 1978, 70, 680-690.

Meichenbaum, D. Cognitive behavior modification: An integrative approach. New York: Plenum Press, 1977.

Owings, R. A., Peterson, G. A., Bransford, S. P., Morris, C. D. and Stein, B. S. Spontaneous monitoring and regulation of learning: A comparison of successful and less successful fifth graders. Journal of Educational Psychology, 1980, 72, 250-256.

Scribner, S. Modes of thinking and ways of speaking: Culture and logic reconsidered. In R. O Freedle (Ed.), New direction in discourse processing. Norwood, NJ: Ablex, 1979.

Vygotsky, L. S. Thought and language (E. Haufman and G. Vakar, Eds. and Trans.). Cambridge, Mass.: The M. I. T. Press, 1962.

Vygotsky, L. S. Mind in society: The development of higher psychological processes. (M. Cole, V. John Stiener, S. Scribner, and E. Touberman, Eds. and Trans.). Cambridge, Mass: Harvard University Press, 1978.

Vygotsky, L. S. The genesis of higher mental function. In T. V. Wertsch (Ed. and Trans.), The concept of activity in Soviet psychology. Armonk, NY: M. E. Sharpe, Inc., 1979.

Wagner, D. A. Memories of Morrocco: The influence of age, schooling and environment on memory. Cognitive Psychology, 1978, 10, 1-28.

Wertsch, T. V. The concept of activity in Soviet psychology. Armond, NY: M. E. Sharpe, Inc., 1979.

Wertsch, T. V. From social interaction to higher psychological processes: A clarification and application of Vygotsky's theory. Human Development 1979, 22, 1-22.

Wozniak, R. H. Psychology and education of the learning disabled child in the Soviet Union. (Research Report No. 78). Minneapolis, Minn.: Center in Education of Handicapped Children, University of Minnesota, December, 1974.